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Measuring Population Equality Among Districts and Compactness

Commission Meeting of August 10, 2021

Presented By: Matthew M. Cannon, Shareholder

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Roadmap for Presentation

- Measuring Population Equality Among Districts
- Reasonably Compact

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Measuring Population Equality

- Ideal Population
  - In a single-member district plan, the "ideal" population is equal to the total state population divided by the total number of districts.

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Ideal Population

Term	Definition	Example
Ideal District Population	= state population / number of districts	10,000 population / 10 districts = 1,000 ideal district population

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Measuring Population Equality

- Deviation
  - The degree by which a single district's population varies from the ideal may be stated in terms of "absolute deviation" (raw numbers) and "relative deviation" (percentage).

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Measuring Population Equality

- Absolute Deviation
  - This is equal to the difference between its population and the ideal population.
  - In other words, the district's population exceeds or falls short of the "ideal" by that number of people.

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Measuring Population Equality

- Relative Deviation
  - More commonly used measure.
  - Divide the district's absolute deviation by the "ideal" population.

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Absolute and Relative Deviations

Term (Individual Districts)	Definition	Examples
Absolute deviation (also known as "raw deviation")	= district population – ideal population	975 district population – 1,000 ideal population = -25 absolute deviation
Relative deviation (also known as "percent deviation")	= absolute deviation / ideal population	-25 absolute deviation / 1,000 ideal population = -0.025 or -2.5% relative deviation

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Measuring Population Equality

- Mean Deviation
  - The “mean deviation” is equal to the sum of the individual district deviations divided by the total number of districts.

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Mean Deviation

Term (All Districts)	Definition	Example
Mean Deviation (also called "average deviation")	= sum of all deviations / number of districts	-2.5 deviation + 1.5 deviation + 1.0 deviation = 5.0/3 districts = 1.67 mean deviation

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Measuring Population Equality

- Overall Range
  - The overall range is the difference in population between the largest and smallest districts.
  - Often referred to as "*maximum deviation*" or "*total deviation*."

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Overall Range – Maximum/Total Deviation

ALL DISTRICTS		Examples
Deviation Range (also called "overall range")	= largest positive deviation and largest negative deviation in a plan	-2.5% largest negative deviation and 1.5% largest positive deviation = deviation range
Overall Range (also called "total deviation")	= largest positive deviation + largest negative deviation (ignore + or – signs)	-2.5 largest negative deviation + 1.5 largest positive deviation = 4.0% total deviation

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Utah Legislative Committee Principles

- 1. Congressional districts must be as nearly equal as practicable with a deviation not greater than ±0.1%.

- 2. State legislative districts and state school board districts must have substantial equality of population among the various districts with a deviation less than ±5.0%.

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Measuring Population Equality

- **.1%** overall range/total deviation for Congressional districts.

- **5%** overall range/total deviation for state legislative districts and state school board districts.

Reasonably Compact

Reasonably Compact

- Each district in each map type must be "reasonably compact."

Reasonably Compact

- No federal standard for measuring compactness.

- Currently, 37 states have a compactness requirement for their state legislative or congressional districts, with the requirements ranging from general language calling for reasonable compactness, to specific technical measures of compactness.

Reasonably Compact

- Generally speaking, compactness refers to the quality of being closely packed together.
- The Supreme Court has held that a district that "reaches out to grab small and apparently isolated minority communities is not reasonably compact."
- Some courts have even relied upon the imprecise adage "you know it when you see it," when evaluating compactness of electoral districts.

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Reasonably Compact

- The Commission shall, to the extent practicable, submit maps with districts that are reasonably compact. Compactness means that districts shall avoid odd shapes or contortions that cannot be explained by other legitimate redistricting criteria.

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Contact:

Matthew M. Cannon
Ray Quinney & Nebeker P.C.
36 South State, #1400
Salt Lake City, UT 84111
mcannon@rqn.com
(801) 323-3364